

## CLAIMS

I claim:

1           1.       In a railroad switch for use with intersecting railroad rails and having  
2 two switch points interconnected by a switch machine between the two switch points  
3 and connected thereto by an operating rod at each end of the switch machine, a  
4 pivoting connector assembly connecting each operating rod to its associated switch  
5 point, the connector assembly comprising:

6           a generally horizontal pivot pin mounted on the associated switch point, with  
7           its longitudinal axis extending substantially parallel to said switch  
8           point;

9           a socket on said operating rod at the outer end thereof, said socket having an  
10          open bore with a vertical axis;

11          a vertical shaft in said operating rod socket bore; and

12          a collar on said vertical shaft, said collar having an open bore adapted to  
13          receive said pivot pin therethrough in longitudinally sliding  
14          engagement, said collar bore being rotatable about said vertical axis of  
15          said socket bore;

16          whereby the switch machine is adapted to move the switch point by extending  
17          and retracting said operating rod by the application of force acting  
18          substantially along the longitudinal axis of said operating rod, and  
19          without binding of said collar on said pivot pin.

1           2.       The connector assembly recited in claim 1, wherein said vertical shaft  
2 is adapted to pivot about its axis, relative to said operating rod socket.

1           3.       The connector assembly recited in claim 2, wherein said collar is  
2 fixedly mounted to said vertical shaft.

1           4.       The connector assembly recited in claim 3, wherein said collar bore is  
2 fixed relative to said collar.

3

1           5.       The connector assembly recited in claim 1, wherein:  
2           said vertical shaft is fixedly mounted in said socket bore; and  
3           said collar bore is adapted to pivot relative to said vertical shaft.

1           6.       The connector assembly recited in claim 5, wherein:  
2           said collar is fixedly mounted to said top end of said vertical shaft; and  
3           said collar bore is adapted to pivot relative to said collar.

1           7.       The connector assembly recited in claim 6, wherein said collar  
2 comprises:  
3           an outer collar member fixedly mounted to said vertical shaft; and  
4           an inner collar member within said outer collar member, said collar bore being  
5           formed in said inner collar member, said inner collar member being  
6           rotatable about said vertical axis relative to said outer collar member.

1           8.       The connector assembly recited in claim 1, wherein said collar  
2 comprises:  
3           an outer collar member fixedly mounted to said vertical shaft; and  
4           an inner collar member within said outer collar member, said collar bore being  
5           formed in said inner collar member, said inner collar member being  
6           rotatable about said vertical axis relative to said outer collar member.

1           9.     A switch machine for operating a railroad switch with two switch  
2 points at intersecting railroad rails, said switch machine comprising:  
3           a housing mounted between said two switch points;  
4           two operating rods, each one of said operating rods having an inner end within  
5           said housing and an outer end extending from said housing for  
6           repositioning one of said switch points, each one of said operating rods  
7           and its associated switch point establishing an angle therebetween for  
8           the application of lateral force to the switch point to move the switch  
9           point;  
10          a shifting mechanism within said housing, said shifting mechanism being  
11          engageable to said inner end of each one of said operating rods, said  
12          shifting mechanism being adapted to simultaneously shift said  
13          operating rods between two positions relative to said housing, resulting  
14          in simultaneous repositioning of said two switch points; and  
15          a connector assembly connecting each one of said extending operating rod  
16          ends to its associated switch point, said connector assembly having  
17          freedom of movement in the horizontal direction extending  
18          substantially parallel to the switch point and being pivotable about a  
19          vertical axis to allow said angle between said operating rod and said  
20          associated switch point to change as said associated switch point is  
21          repositioned;  
22          whereby said switch machine is adapted to move said switch points by  
23          extending and retracting said operating rods by the application of said  
24          force acting substantially along the longitudinal axes of said operating  
25          rods.

1           10.    The switch machine recited in claim 9, wherein each said connector  
2 assembly comprises:

3           a horizontal pivot pin mounted on the associated switch point, with its  
4           longitudinal axis extending substantially parallel to said switch point;  
5           a socket on said operating rod at the outer end thereof, said socket having an  
6           open bore with a vertical axis;  
7           a vertical shaft in said operating rod socket bore; and  
8           a collar on said vertical shaft, said collar having an open bore adapted to  
9           receive said pivot pin therethrough in longitudinally sliding  
10          engagement, said collar bore being rotatable about said vertical axis of  
11          said socket bore.

1           11.    The switch machine recited in claim 10, wherein each said vertical  
2 shaft is adapted to pivot about its axis, relative to its associated said operating rod  
3 socket.

1           12.    The switch machine recited in claim 11, wherein each said collar is  
2 fixedly mounted to its associated said vertical shaft.

1           13.    The switch machine recited in claim 12, wherein each said collar bore  
2 is fixed relative to its associated said collar.

1           14.    The switch machine recited in claim 10, wherein:  
2 each said vertical shaft is fixedly mounted in its associated said socket bore;  
3           and  
4 each said collar bore is adapted to pivot relative to its associated said vertical  
5 shaft.

1           15.    The switch machine recited in claim 14, wherein:  
2           each said collar is fixedly mounted to the top end of its associated said vertical  
3           shaft; and  
4           each said collar bore is adapted to pivot relative to its associated said collar.

1           16.    The switch machine recited in claim 15, wherein each said collar  
2 comprises:  
3           an outer collar member fixedly mounted to the associated said vertical shaft;  
4           and  
5           an inner collar member within said outer collar member, said collar bore being  
6           formed in said inner collar member, said inner collar member being  
7           rotatable about said vertical axis relative to said outer collar member.

1           17.    The switch machine recited in claim 10, wherein each said collar  
2 comprises:  
3           an outer collar member fixedly mounted to the associated said vertical shaft;  
4           and  
5           an inner collar member within said outer collar member, said collar bore being  
6           formed in said inner collar member, said inner collar member being  
7           rotatable about said vertical axis relative to said outer collar member.

1           18.    The switch machine recited in claim 9, wherein each said connector  
2 assembly comprises:  
3           a horizontal pivot pin mounted on the associated switch point, with its  
4           longitudinal axis extending substantially parallel to said switch point;  
5           and  
6           a collar on a respective said operating rod, said collar having an open bore  
7           adapted to receive said pivot pin therethrough in longitudinally sliding  
8           engagement, said collar bore being pivotable about a vertical axis.